

REMARKS

Claims 1-18 are all the claims pending in the application.

The Examiner will kindly note the following point with regard to the interpretation of the claims of the present application. The positive resist composition of the invention includes, inter alia, a resin (A) “comprising at least one kind of acrylate derivative repeating units.” (emphasis added). The reference is to an “acrylate” derivative repeating unit, and not to a “methacrylate” derivative repeating unit. As explained at page 11, second full paragraph of the present specification, the resin (A) may include repeating units derived from methacrylate derivatives, provided that it includes at least one acrylate derivative repeating unit.

In Paragraph No. 2 of the Action, claims 1-17 are provisionally rejected for obviousness-type double patenting as allegedly being unpatentable over claims 1-23 of co-pending application No. 10/937,270 (U.S. 2005-0095532 A1).

It appears that the most relevant claims of the Kodama et al '270 application are claims 8, 9 and 20.

Applicants submit that this rejection should be withdrawn because the present claims are not merely an obvious variant of what is claimed in the Kodama et al '270 application.

Specifically, the claims of Kodama et al '270 do not disclose or suggest element (C) of the present claims, namely, a mixed organic solvent comprising at least one solvent selected from a propylene glycol monoalkylether carboxylate, an alkyl lactate and a linear ketone; and a cyclic ketone. Claim 8 of Kodama et al '270 recites that the composition comprises a solvent including at least one cyclic ketone, and claim 20 of Kodama et al '270 calls for a mixed solvent

of a solvent containing a hydroxyl group in its structure and a solvent not containing a hydroxyl group in its structure, but no claim of Kodama et al '270 clearly discloses or suggests the specific mixed solvent called for in element (C) of the present claims.

A further distinction is that the present claims in element (A) require that the resin include at least one kind of acrylate derivative repeating unit.

A still further distinction relates to the recitation in element (A) of present claim 1 that the resin has a glass transition temperature in the range of from 70 to 155°C. The claims of Kodama et al '270 do not require that Kodama et al's resin have a glass transition temperature within this range, or suggest that Kodama et al's resin should have a glass transition temperature within this range.

The resin according to the present invention is characterized in that it contains at least one kind of acrylate derivative repeating unit, and has a T_g in a specified range (70 to 155°C). As discussed above, these features are not disclosed, or fairly taught or suggested, in the claims of Kodama et al '270. While not necessary to overcome the double patenting rejection, Applicants further note that by satisfying the requirements of the present claims, excellent results can be achieved in terms of improvements in the line edge roughness (LER) and the defocus latitude (DOF). These superior results cannot be predicted from Kodama et al '270, which pertains to process window and exposure margin. See Kodama et al '270 at [0852] and [0854].

Further, the superior results attained by satisfying the requirements with respect to the glass transition temperature (T_g) range for the present invention are apparent by comparing, for example, Example 5 with Comparative Example 2 of the present invention.

Based on these distinctions, Applicants respectfully traverse the rejection.

In Paragraph No. 3 of the Action, claims 1-17 are rejected for obviousness-type double patenting as allegedly being unpatentable over claims 1-15 of U.S. Patent 6,787,282.

Applicants submit that this rejection should be withdrawn because the positive resist composition of the present claims is not merely an obvious variant of the positive resist composition claimed in the '282 patent.

The most relevant claims in the '282 patent appear to be claims 1, 2, 5, 8 and 15.

The claims of the '282 patent do not disclose or suggest element (C) of the present claims, that is, a mixed organic solvent as specified in element (C) of present claim 1. Claim 15 of the '282 patent calls for "an organic solvent", but it does not suggest employing a mixed organic solvent, let alone the specific mixed organic solvent called for in the present claims.

A further distinction over the claims of the '282 patent is that in element (A) of the present claims, the resin must include at least one kind of acrylate derivative repeating unit.

Still further, the claims of the '282 patent do not require or suggest that the resin employed must have a glass transition temperature in the range of 70 to 155°C.

And while not necessary to overcome the double patenting rejection, Applicants again refer to the superior results discussed above, in relation to the preceding rejection. The superior results obtained with the present invention relative to improvements in the line edge roughness (LER) and the defocus latitude (DOF) cannot be predicted from the Sato '282 patent, which pertains to pattern collapsing, surface roughness after etching, and pitch dependency. See Sato '282 at column 2, lines 30-37.

Based on the above distinctions, Applicants respectfully traverse the rejection.

In Paragraph No. 5 of the Action, claims 1-18 are rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Kodama et al (EP 1179750).

Applicants submit that this rejection should be withdrawn because Kodama et al EP '750 does not disclose or render obvious the positive resist composition of the present invention.

The Examiner states that Kodama et al disclose a positive photoresist comprising a resin, a solvent, a nitrogen-containing basic compound (page 82), a surfactant (page 85), and an acid generator (pages 7-20).

The Examiner states that the resins appear to meet the present claim limitations. The Examiner says to see especially resin (36) on page 98, resins (9) and (11) on page 90, resin (12) on page 91, and resin (15) on page 92.

With due respect, the cited resins are not within the scope of the present claims. Resins (9), (11), (12) and (15) do not contain any acrylate repeating unit, and are therefore different from the resin (A) of the present invention. As discussed above, resin (A) of the present invention must include "at least one kind of acrylate derivative repeating units." See present claim 1. The cited resins may contain methacrylate derivative repeating units, but they do not contain an acrylate derivative repeating unit.

Further, Resins (9), (11), (12), (15) and (36) of Kodama et al EP '750 do not contain a repeating unit represented by formula (AII) of present claim 1, and are therefore different from the present invention.

For example, the left-most unit of Resin (9) is a unit for acid decomposition, and includes a -CH₂CH₃ group which places it outside the scope of present formula (AII).

On review of Kodama et al EP '750, it appeared to Applicants that Resins (3), (4), (6), (7) and (14) set forth in Kodama et al '750 were more relevant to the resin of the present invention. Accordingly, Applicants have focused on these resins of Kodama et al EP '750.

Resins (3), (4), (6) and (7), which do not contain any acrylate repeating unit, are different from the resin of the present invention for at least this reason.

Resin (14) appears to be included in the structural scope of the resin of the present invention. However, the glass transition temperature T_g of Resin (14) of Kodama et al. EP '750 is outside the 70 to 155°C range recited in present claim 1, and Resin (14) is therefore outside the scope of the present invention. In this regard, the Examiner will kindly refer to the Declaration Under 37 C.F.R. § 1.132 of Mr. Fumiyuki Nishiyama submitted herewith.

Mr. Nishiyama's Declaration also reports on a Comparative Example conducted with Resin (14) of Kodama et al EP '750. A comparison of the results in Mr. Nishiyama's Declaration to the results of Examples 1-17 in the present specification shows that the present invention employing a composition containing (1) a polymer having a specific structure and a T_g within a specific range and (2) a specific solvent provides superior results in comparison to compositions which do not satisfy these requirements. These superior results in terms of line edge roughness (LER) and defocus latitude (DOF) would not have been expected in view of Kodama et al EP '750, which pertains to exposure margin and pitch dependency. See Kodama et al EP '750 at page 3, paragraph [0013]. The evidence in Mr. Nishiyama's Declaration and in the working Examples in the present specification supports the patentability of the present invention over Kodama et al EP '750.

In view of the above, the Examiner is respectfully requested to reconsider and withdraw the rejection of claims 1-18 based on Kodama et al EP '750.

In Paragraph No. 6 of the Action, claims 1-18 are rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Sato (6,787,282).

Applicants submit that this rejection should be withdrawn because Sato '132 does not disclose or render obvious the positive resist composition of the present invention.

The Examiner's discussion of Sato '282 is very brief. Applicants have referred to Example 4 shown in Table 2 at columns 77-78 of Sato '282, since this appears to be the closest disclosure in Sato '282 pertaining to the present invention. In this example, Sato employed a mixed solvent of PGMEA/PGME/gamma butyrolactone which would appear to satisfy element (C) of the present claims.

Example 4 of Sato '282 also employed a photo-acid generator, which would satisfy element (B) of present claim 1.

As to element (A) of the present claims, Sato Example 4 employed Resin (4) of Sato, which is shown at col. 74 of Sato. This resin does not appear to satisfy the requirements of element (A) of present claim 1. Properly interpreted, claim 1 requires that the resin (A) have at least one repeating unit selected from repeating units represented by formula (IV) and repeating units having groups represented by formulas (V-1), (V-2), (V-3) and (V-4). In addition, the resin must include a repeating unit represented by formula (AII). Resin (4) at col. 74 of Sato '282 fails to satisfy this requirement because, while it appears to include a resin within the scope of formula (AII), namely, the lower left-hand repeating unit of the four repeating units shown, it

does not include a repeating unit within the scope of formula (IV) or a repeating unit within the scope of formula (V-1), (V-2), (V-3) or (V-4).

For at least this reason, Sato '282 does not anticipate the present claims.

In addition, the resin of Example 4 of Sato '282 does not have a glass transition temperature T_g within the 70 to 155°C range recited in present claim 1, and is therefore outside the scope of the present invention. In this regard, the Examiner will kindly refer to Mr. Nishiyama's Declaration Under 37 C.F.R. § 1.132.

As in the case of Kodama et al EP '750, Mr. Nishiyama's Declaration also reports on a Comparative Example conducted with Resin (4) of Sato '282. A comparison of the results in Mr. Nishiyama's Declaration to the results of Examples 1-17 in the present specification shows that the present invention employing a composition containing (1) a polymer having a specific structure and a T_g within a specific range and (2) a specific solvent provides superior results in comparison to compositions which do not satisfy these requirements. These superior results in terms of line edge roughness (LER) and defocus latitude (DOF) would not have been expected in view of Sato '282, which, as noted previously in relation to the obviousness-type double patenting rejection based on Sato '282, pertains to pattern collapsing, surface roughness after etching, and pitch dependency. See Sato '282 at column 2, lines 30-37. The evidence in Mr. Nishiyama's Declaration and in the working Examples in the specification supports the patentability of the present invention over Sato '282.

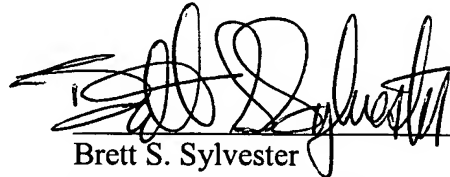
In view of the above, the Examiner is respectfully requested to reconsider and withdraw the rejection of claims 1-18 based on Sato '282.

Amendment Under 37 C.F.R. § 1.111
U.S. Application No. 10/809,389

Allowance is respectfully requested. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Brett S. Sylvester", is written over a horizontal line.

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